FILE

Project name Riverdale

Project number 49620

Category Tech

SEVERN TRENT SERVICES

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ANALYTICAL REPORT

RIVERDALE

Lot #: A0H290117

Rae Mindock

RMT
222 South Riverside Plaza
Suite 820
Chicago, IL 60606

SEVERN TRENT LABORATORIES, INC.

Kenneth J. Kuzior
Project Manager

September 11, 2000

CASE NARRATIVE

A0H290117

The following report contains the analytical results for two solid samples submitted to STL North Canton by RMT from the Riverdale Site. The samples were received on August 29, 2000, according to documented sample acceptance procedures.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the analytical methods summary page in accordance with the methods indicated. Preliminary results were provided by facsimile transmission to Heather Seus on September 6, 2000. A summary of QC data for these analyses is included at the rear of the report.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

ANALYTICAL METHODS SUMMARY

A0H290117

PARAMETER	ANALYTICAL METHOD
Organochlorine Pesticides	SW846 8081A
Total Residue as Percent Solids	MCAWW 160.3 MOD

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A0H290117

WO #	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
DJJJH	001	SL40-5.2'	08/28/00	09:25
DJJJN	002	SL41-5.2'	08/28/00	09:15

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

RMT

Client Sample ID: SL40-5.2'

GC Semivolatiles

Lot-Sample #...: A0H290117-001	**Work Order #...:** DJJJH102	**Matrix.....:** SO	
Date Sampled...: 08/28/00 09:25	**Date Received..:** 08/29/00		
Prep Date.....: 08/30/00	**Analysis Date..:** 09/05/00		
Prep Batch #...: 0243096			
Dilution Factor: 100			
% Moisture.....: 11	**Method.....:** SW846 8081A		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aldrin	**7100**	**190**	**ug/kg**
alpha-Chlordane	ND	190	ug/kg
gamma-Chlordane	**330**	**190**	**ug/kg**
Dieldrin	ND	190	ug/kg
Heptachlor	**500**	**190**	**ug/kg**
Heptachlor epoxide	ND	190	ug/kg
Toxaphene	ND	7600	ug/kg
Chlordane (technical)	ND	1900	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	0.0 DIL,*	(31 - 131)
Decachlorobiphenyl	0.0 DIL,*	(18 - 145)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

* Surrogate recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

RMT

Client Sample ID: SL41-5.2'

GC Semivolatiles

Lot-Sample #...: A0H290117-002 **Work Order #...:** DJJJN102 **Matrix.....:** SO
Date Sampled...: 08/28/00 09:15 **Date Received..:** 08/29/00
Prep Date.....: 08/30/00 **Analysis Date..:** 09/06/00
Prep Batch #...: 0243096
Dilution Factor: 2500
% Moisture.....: 14 **Method.....:** SW846 8081A

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aldrin	**120000**	**4900**	**ug/kg**
alpha-Chlordane	ND	4900	ug/kg
gamma-Chlordane	**5100**	**4900**	**ug/kg**
Dieldrin	ND	4900	ug/kg
Heptachlor	**11000**	**4900**	**ug/kg**
Heptachlor epoxide	ND	4900	ug/kg
Toxaphene	ND	190000	ug/kg
Chlordane (technical)	ND	49000	ug/kg

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	0.0 DIL,*	(31 - 131)
Decachlorobiphenyl	0.0 DIL,*	(18 - 145)

NOTE(S):

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

* Surrogate recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

QUALITY CONTROL SECTION

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

STL North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. STL North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL), the analytes were greater than 10 times the blank level for organics or 20 times for inorganics, or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

** for analyses run on TJA Trace ICP only*

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

QUALITY CONTROL ELEMENTS OF SW-846 METHODS
(Continued)

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable. The acceptance criteria does not apply to samples that are diluted for organics if the native sample amount is 4x the concentration of the spike for inorganics.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch is acceptable if the Method Blank, LCS, and LCSD surrogate recoveries are within acceptance criteria. The only exception is if the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide/PCB, PAH, and Herbicide methods, the surrogate criteria is that one of two surrogate compounds meet acceptance criteria.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Semivolatiles

Client Lot #...: A0H290117 **Work Order #...:** DJL1A102 **Matrix.....:** SOLID
LCS Lot-Sample#: A0H300000-096
Prep Date.....: 08/30/00 **Analysis Date..:** 09/01/00
Prep Batch #...: 0243096
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
Heptachlor	**66**	**(39 - 126)**	**SW846 8081A**
Aldrin	**68**	**(39 - 122)**	**SW846 8081A**
Dieldrin	**75**	**(45 - 128)**	**SW846 8081A**
gamma-BHC (Lindane)	**68**	**(47 - 130)**	**SW846 8081A**
Endrin	**89**	**(47 - 133)**	**SW846 8081A**
4,4'-DDT	**86**	**(35 - 144)**	**SW846 8081A**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	59	(31 - 131)
Decachlorobiphenyl	87	(18 - 145)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

METHOD BLANK REPORT

GC Semivolatiles

Client Lot #...: A0H290117 **Work Order #...:** DJL1A101 **Matrix.....:** SOLID
MB Lot-Sample #: A0H300000-096

Prep Date.....: 08/30/00
Analysis Date..: 09/01/00 **Prep Batch #...:** 0243096
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Aldrin	ND	1.7	ug/kg	SW846 8081A
Dieldrin	ND	1.7	ug/kg	SW846 8081A
Heptachlor	ND	1.7	ug/kg	SW846 8081A
Heptachlor epoxide	ND	1.7	ug/kg	SW846 8081A
Toxaphene	ND	67	ug/kg	SW846 8081A
alpha-Chlordane	ND	1.7	ug/kg	SW846 8081A
gamma-Chlordane	ND	1.7	ug/kg	SW846 8081A
Chlordane (technical)	ND	17	ug/kg	SW846 8081A

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	72	(31 - 131)
Decachlorobiphenyl	87	(18 - 145)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Semivolatiles

Client Lot #...: A0H290117 **Work Order #...:** DJJJN105-MS **Matrix.....:** SO
MS Lot-Sample #: A0H290117-002 DJJJN106-MSD
Date Sampled...: 08/28/00 09:15 **Date Received..:** 08/29/00
Prep Date.....: 08/30/00 **Analysis Date..:** 09/06/00
Prep Batch #...: 0243096
Dilution Factor: 2500

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Heptachlor	**0.0 DIL,a**	**(32 - 128)**			**SW846 8081A**
	0.0 DIL,a	**(32 - 128)**	**0.0**	**(0-44)**	**SW846 8081A**
Aldrin	**964 DIL,a**	**(33 - 122)**			**SW846 8081A**
	267 DIL,a	**(33 - 122)**	**0.72**	**(0-40)**	**SW846 8081A**
Dieldrin	**0.0 DIL,a**	**(33 - 133)**			**SW846 8081A**
	0.0 DIL,a	**(33 - 133)**	**0.0**	**(0-33)**	**SW846 8081A**
gamma-BHC (Lindane)	**0.0 DIL,a**	**(33 - 130)**			**SW846 8081A**
	0.0 DIL,a	**(33 - 130)**	**0.0**	**(0-36)**	**SW846 8081A**
Endrin	**0.0 DIL,a**	**(33 - 138)**			**SW846 8081A**
	0.0 DIL,a	**(33 - 138)**	**0.0**	**(0-38)**	**SW846 8081A**
4,4'-DDT	**604 DIL,a**	**(23 - 144)**			**SW846 8081A**
	453 DIL,a	**(23 - 144)**	**22**	**(0-42)**	**SW846 8081A**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	0.0	(31 - 131)
	Qualifiers: DIL,*	
	0.0	(31 - 131)
	Qualifiers: DIL,*	
Decachlorobiphenyl	0.0	(18 - 145)
	Qualifiers: DIL,*	
	0.0	(18 - 145)
	Qualifiers: DIL,*	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

a Spiked analyte recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

* Surrogate recovery is outside stated control limits.

STL
Committed To *Your* Success

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Sent to: STL North Canton

Report To:
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Fax: 312 575 0300
E-Mail:

Bill To:
Contact: Rae Mindock
Company: RMT
Address: 222 S. Riverside Plaza Suite 820 Chicago, IL 60606
Phone: 312 575 0200
Fax: 312 575 0300
PO#: Quote:

Lab Lot #

Package Sealed Yes No	Samples Sealed Yes No
Received on Ice Yes No	Samples Intact Yes No
Temperature °C of Cooler	
Within Hold Time Yes No	Preserv. Indicated Yes No NA
pH Check ok Yes No NA	Res. Cl_2 Check ok Yes No NA
Sample Labels and COC Agree Yes No COC not present	

Sampler Name: H. Sevs
Signature: Heather Lewis
Project Name: Riverdale
Project Number:
Project Location:
Lab PM:
Date Required Hard Copy: / / Fax: / /

Laboratory ID	MS-MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	Refrg #	# Cont.	Volume	Preserv.	COC Pest SW846	COC Pest CLP	COC PEST CLP	COC & Arm CLP	Additional Analyses / Remarks
		SL40-5.2'	8.28.00	9:25	S			1	4oz	Ice	X				COC*: COC's are Aldrin,
		SL40-5.2'	8.28.00	9:25	S			1	4oz	Ice		X			Dieldrin, Heptachlor epoxide,
		SL41-5.2'	8.28.00	9:15	S			1	4oz	Ice	X				Heptachlor, Alpha/gamma
		SL41-5.2'-Dup	8.28.00	9:15	S			1	4oz	Ice	X	X	X		chlordane
	X	SL41-5.2'			S									X	
					S										
					S										
					S										
					S										
					S										
					S										

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
Heather Lewis	RMT	8.28.00					
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
					STL-NC	8-29-00	10⁰⁰

Matrix Key
WW = Wastewater
W = Water
S = Soil
SL = Sludge
MS = Miscellaneous
OL = Oil
A = Air
SE = Sediment
SO = Solid
DS = Drum Solid
DL = Drum Liquid
L = Leachate
WI = Wipe
O = _____

Container Key
1. Plastic
2. VOA Vial
3. Sterile Plastic
4. Amber Glass
5. Widemouth Glass
6. Other _____

Preservative Key
1. HCl, Cool to 4°
2. H_2SO_4, Cool to 4°
3. HNO_3, Cool to 4°
4. NaOH, Cool to 4°
5. NaOH/Zn Acetate, Cool to 4°
6. Cool to 4°
7. None

COMMENTS:

Date Received / /
Courier: Hand Delivered
Bill of Lading: 922758941852

STL North Canton